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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/635,430	08/05/2003	William Alfred Reed	Reed 29-10	8553

7590 03/01/2004

Docket Administrator (Room 3J-219)  
Lucent Technologies Inc.  
101 Crawfords Corner Road  
Holmdel, NJ 07733-3030

EXAMINER
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KIANNI, KAVEH C

ART UNIT	PAPER NUMBER
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2877

DATE MAILED: 03/01/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

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<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/635,430	REED ET AL.	
	<b>Examiner</b>	<b>Art Unit</b>	
	Kevin C Kianni	2877	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 05 August 2003.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-9 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-4, 6 and 8 is/are rejected.
- 7) ☒ Claim(s) 5, 7 and 9 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

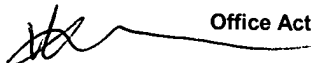
- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 05 August 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>3</u> . | 6) <input type="checkbox"/> Other: _____  |



### **DETAILED ACTION**

- Acknowledgement made of applicant's cancellation of claims 10-25 in preliminary amendment (8/05/2003).

#### ***Allowable Subject Matter***

1. Claims 5, 7 and 9 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Claim 5 is allowable because the prior art of record, taken alone or in combination, fails to disclose or render obvious wherein the lens has a magnification, the magnification times the size of a fundamental propagation mode of the first fiber being about equal to the size of a fundamental propagation mode of the second fiber in combination with the rest of the limitations of the base claim.

Claim 7 is allowable because the prior art of record, taken alone or in combination, fails to disclose or render obvious wherein each fiber has a core and a cladding; and a discontinuity in refractive index across an interface between the core and cladding, the discontinuities being different across the interfaces of the first and second fibers in combination with the rest of the limitations of the base claim.

Claim 9 is allowable because the prior art of record, taken alone or in combination, fails to disclose or render obvious wherein the GRIN fiber lens has a core with a graded refractive index profile, the profile having a radial second

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derivative whose average magnitude is less than about  $2.4 \times 10^{-5}$  microns<sup>-2</sup> in the core in combination with the rest of the limitations of the base claim.

***Claim Rejections –***

***35 USC § 102***

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

***and - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1-3, 6 and 8 are rejected under 35 U.S.C. 102(b) as being anticipated by Abe (US 5,757,993).

Regarding claims 1-3, Abe teaches an apparatus for mode converting (shown at least in fig. 4; see col. 3, lines 5-17; wherein mode conversion, change in mode field diameter, occurs while optically coupling/interfaces different optical fiber(s) with GRIN lens), comprising:

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first and second optical waveguides/fibers 24a,b (see abstract and col. 1, lines 9-12), and a GRIN fiber lens 12 attached to both the first and the second waveguides/fibers 24a,b (wherein one or two GRIN lenses can be used, see col. 3, lines 50-51);

and wherein one end of the GRIN fiber lens 12a is attached directly to an end 26a of the first optical waveguide/fiber 24a and an opposite end of the GRIN fiber lens 12b is attached directly to an end of the second optical waveguide/fiber 26b, wherein the attached ends of the first and second optical waveguides/fibers 24a,b are fused or glued to the GRIN fiber lens 12 (shown in fig. 4, items 24 and 12).

Regarding claims 6 and 8, Abe further teaches wherein the first and second fibers have cores with different diameters (see col. 3, lines 38-60+; also col. 4, lines 2-9, wherein the fiber core diameters have a range/expansion of at least between 4 to 10  $\mu\text{m}$ ); a series of connected GRIN fiber lenses 12a,b, the first GRIN fiber lens 12a of the series being attached to the first fiber 24a and the last GRIN fiber lens 12b of the series being attached to the second fiber 24b.

4. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Abe.

Regarding claim 4, Abe, as stated above, teaches all limitations of claim 3. However, Abe does not specifically teach wherein the first fiber has propagation modes with different sizes than the second fiber. Nevertheless, Abe states that mode field size of an optical fiber is directly proportional to its core size diameter

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(see col. 1, lines 16-30) and that the mode matching between two dissimilar fibers is well known (col. 1, lines 31-37), and that the object of the invention is to improve the prior art of coupling the cores of optical fibers using GRIN lens (see col. 1, line 38-col. 2, line 6-9; see also col. 3, line 51-col. 4, line 10) that includes dissimilar fibers (see at least col. 1, lines 35-37). Thus, it would have been obvious to a person of ordinary skill in the art when the invention was made to modify Abe's optical mode conversion device by choosing the two optical fibers 24a and 24b with two different core sizes in order to produce an optical mode conversion system that includes the above limitation, since the resultant optical system would: (a) improve fiber to fiber coupling by reducing spherical aberration (see col. 2, lines 6-9) and would make it less sensitive to misalignment (see col. 3, lines 51-60) .

### ***Citation of Relevant Prior Art***

5. Prior art made of record and not relied upon is considered pertinent to applicant's disclosure. In accordance with MPEP 707.05 the following references are pertinent in rejection of this application since they provide substantially the same information disclosure as this patent does. These references are:

Duck et al. 5701375	Teaches at least claim 1
Ao 6411753	Teaches at least claim 1
Bhagavatula 6507438	Teaches at least claim 1
Swanson et al. 6445939	Teaches at least claim 1
Riza 6222954	Teaches at least claim 1
Nelson 4493212	
Laughin 5566260	
Ikuta et al. 5844410	
Pan 5608831	

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Kazzuo et al. Journal of Lightwave Technology, v. 8, no. 8, 8/1990.  
Teaches at least claim 1.

Shiraishi et al. IEE Photonics Technology Letters, v.8, no. 12, 12/1998  
Teaches at least claim 1

These references are cited herein to show the relevance of the apparatus/methods taught within these references as prior art.

**Contact Information**

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to K. Cyrus Kianni whose telephone number is (571) 272-2417.

The examiner can normally be reached on Monday through Friday from 8:30 a.m. to 6:00 p.m. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Frank Font, can be reached at (571) 272-2415.

**Any response to this action should be mailed to:**

Commissioner of Patents and Trademarks  
Washington, D.C. 20231

**or faxed to:**

(703) 872-9306 (for formal communications intended for entry)

**or:**

Hand delivered responses should be brought to Crystal Plaza 4, 2021  
South Clark Place, Arlington, VA., Fourth Floor (Receptionist).

Any inquiry of a general nature or relating to the status of this application should be directed to the Group Receptionist whose telephone number is (703) 308-0956.



K. Cyrus Kianni  
Patent Examiner  
Group Art Unit 2877

February 10, 2004